AMENDMENTS IN THE CLAIMS:

1. (Currently Amended) A superconducting electromagnet apparatus comprising a main coil assembly (1; 1') for producing a central magnetic field in a working volume, main current supply means (5) connected to the main coil assembly for energising and de-energising the main coil assembly, and for persisting the superconducting current flow in the main coil assembly when a desired constant current level has been reached, in order to generate a central magnetic field of high homogeneity in the working volume, a B0 shim coil assembly (2; 2') for providing fine adjustment of the central magnetic field (B0 being the magnetic field along a central axis), the B0 shim coil assembly comprising superconducting shim coil means connected within a closed loop and arranged to magnetically couple with the main coil assembly (1; 1'), auxiliary current supply means (6) connected to the B0 shim coil assembly for supplying current to the closed loop, and for persisting the superconducting current flow in the closed loop when a desired constant current level has been reached, in order to provide fine adjustment of the central magnetic field within the working volume without significantly degrading the homogeneity of the central magnetic field, and control means (31, 38) for controlling the main and auxiliary current supply means (5, 6), wherein the main coil assembly (1; 1'), the B0 shim coil assembly (2; 2') and the control means (31, 38) ~~[are]~~ provide significant compensation, resulting in a sustained improvement in performance, for the effect of variation of the magnetic field within the working volume with time whilst the current flow in the main coil assembly (1; 1') and the B0 shim coil assembly (2; 2') remains superconducting.

2. (Original) Apparatus according to claim 1, wherein the main coil assembly (1; 1'), the B0 shim coil assembly (2; 2') and the control means (31, 38) are adapted to compensate for the effect of time variation of the magnetic field within the working volume as a result of variation of the ambient magnetic field with time.

3. (Previously Presented) Apparatus according to claim 1, wherein the main coil assembly (1; 1'), the B0 shim coil assembly (2; 2') and the control means (31, 38) are adapted to compensate for the effect of time variation of the magnetic field within the working volume as a result of variation of the current flow in the main coil assembly with time.

4. (Previously Presented) Apparatus according to claim 1, wherein the B0 shim coil assembly (2; 2') is constructed from a material having a critical current value, at which the B0 shim coil assembly would revert to the normal conducting state, which is significantly greater than the value of the current required to compensate for time variation of the magnetic field within the working volume.

5. (Previously Presented) Apparatus according to claim 1, wherein the B0 shim coil assembly (2;2') incorporates at least one coil wound on the same former as at least one coil of the main coil assembly.

6. (Previously Presented) Apparatus according to claim 1, wherein the auxiliary current supply means (6) incorporates a superconducting switch (4) including a heating element for heating the switch (4) to drive it out of its superconducting state to cause the current passing through the switch (4) to decay.

7. (Previously Presented) Apparatus according to claim 1, wherein the main current supply means (5) incorporates a superconducting switch (3) including a heating element for heating the switch (3) to drive it out of its superconducting state to cause the current in the main coil assembly (1; 1') to decay.

8. (Previously Presented) Apparatus according to claim 1, wherein the auxiliary current supply means (6) includes input terminals to which current is supplied under control of the control means (31) during initial energisation of the B0 shim coil

assembly (2; 2'), such current supply to the input terminals being terminated when the current flowing in the closed loop has reached the desired level.

9. (Previously Presented) Apparatus according to claim 1, wherein the main coil assembly (1; 1') comprises a plurality of superconducting main coils connected in series within a closed loop.

10. (Previously Presented) Apparatus according to claim 1, wherein the main coil assembly (1; 1') comprises at least one coil wound in one direction and at least one other coil wound in the opposite direction.

11. (Previously Presented) Apparatus according to claim 1, wherein the B0 shim coil assembly (2; 2') comprises a plurality of superconducting shim coils connected in series within a closed loop.

12. (Original) Apparatus according to claim 11, wherein at least one of the coils of the B0 shim coil assembly (2; 2') is constituted by part of the main coil assembly.

13. (Previously Presented) Apparatus according to claim 1, wherein the B0 shim coil assembly (2; 2') comprises at least one coil wound in one direction and at least one other coil wound in the opposite direction.

14. (Previously Presented) Apparatus according to claim 1, wherein at least one further shim coil assembly (29) is provided for adjustment of the degree of homogeneity of the central magnetic field.